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comycetes 44, Myxomycetes 1, and of the so-called imperfect fungi 33. In Century VII, there are of Basidiomycetes 13, Ascomycetes 42. Mixomycetes 2, miscellaneous species and imperfect forms 43. These five sets, which now aggregate 700 species, are well nigh indispensable to the botanist who wishes to intelligently study the lower plants. Their cheapness (\$7 per Century, mounted and labeled), ought to commend them to the curators of college herbaria.—Professor Spalding, of the University of Michigan, has reprinted from the *Therapeutic Gazette*, an interesting pamphlet of 16 pp. on *Ustilago maydis*, the smut of Indian corn. Several wood-cuts serve to illustrate the text.—Dr. Sturtevant has been studying the subject of seedless fruits, and has embodied his results in a paper recently printed by the Massachusetts Horticultural Society. He has brought together a large number of very curious facts.—G. E. Davenport describes in the June *Torrey Bulletin* a new fern, *Cheilanthes Parishii*, from California. An excellent plate, by Faxon, accompanies the text.—Professor Tuckerman in the same number of the *Bulletin* directs attention to a forthcoming work ("Symbolæ Licheno-Mycologicæ") by Dr. Minks, of microgonidia-fame. From the Professor's notice it appears that Dr. Minks proposes to show, not that lichens are fungi, but that many plants hitherto called fungi are in reality lichens!—Dr. Farlow also describes a *Carpinus*, which grew in a jar of water!—The June *Botanical Gazette* contains many valuable papers, among which are the following: Descriptions of New Plants from New Mexico and Arizona, by E. L. Greene; Chlorophyll, by Professor Coulter; Iowa additions to the N. A. Flora by Dr. Engelmann; New Species of Fungi, by C. H. Peck. Dr. Engelmann describes a new species of Conifer, *Tsuga Caroliniana*, nearly related to our common hemlock spruce. It is from the mountains of North and South Carolina.—A catalogue of the Musci of the valleys of the Serchio and the Magra (central Italy west of the Appenines), by Fitzgerald and Bottini, occupies about 100 pp. of the April number of *Nuovo Giornale Botanico Italiano*. Three hundred and sixty-nine species are noticed. Full notes as to habitat and locality accompany each entry.

ZOÖLOGY.

BRIEF NOTES ON SOME IOWA BIRDS.—I have heretofore stated my belief that the indigo bird (*Cyanospiza cyanea* Baird), is a summer resident of this section. I have no doubt of this—for I saw them here in our thickets on many occasions during the month of May, though I have not yet found a nest. But they sang in the tree-tops, and hunted insects as if "to the manor born;" to-day I saw another, so I concluded that their nests must be near by.

I also mentioned seeing a robin (*Turdus migratorius*) during the

"blizzard" times last winter. After my article was sent away, I repeatedly saw one, which I presumed to have been the same bird. It undoubtedly tarried with us during all of our unexceptionably severe winter. I am also reliably informed that these birds wintered in large numbers in Boone county, thirty or forty miles south of this place, that they made their homes in some of the deep ravines which extend back from the Des Moines river. In these ravines there would generally be open water from springs, about which they could doubtless pursue food, while the high timbered bluffs would very materially modify the severe climate.

A few nights ago a young friend was passing an old mill just across the river from me, with a lighted lantern. His attention was attracted to some flying creatures, which came very close to him, and which he thought at first were bats. But stopping a moment, he caught two of them, and they proved to be swallows, which had lately arrived, and were building their nests under the eaves of "that ancient mill." I read of birds being attracted by a light, and killing themselves by flying against the windows of lighthouses, or other elevated buildings, but never before of an instance of this kind.

I have often thought that there is one marked difference between the blue jays of western New York and Pennsylvania, as I knew them when a boy, forty years ago, and ours here in Iowa. In those days there were still deep woods in that region where great groves of pine and hemlock had never been disturbed by the woodman's axe. These dark recesses, miles from settlements, were favorite resorts of the blue jay, and the recollection of their far away screams and calls comes back to me whenever I hear the same notes here! But there is this difference: Our jays are very tame, almost half domesticated, coming freely to our barnyards and corn-cribs, and helping themselves, in a bold, confident way, often robbing the nest of a hen or a duck as freely as they perpetrate the same depredations upon the robins and thrushes. Some years ago so tame are they here, the little daughter of a friend of mine saw a blue jay very busily pecking at some object, doubtless an ear of corn. Approaching stealthily, she clapped her hands upon his sides and captured him! It is amusing to see them eat a kernel of our large western corn. They cannot swallow the grains whole, and are compelled to break them into two or more pieces. This they do with powerful strokes of their bills, while holding the grain upon the ground or other hard surface with one foot. These strokes come down as systematically as a blacksmith hits a hot iron with his hammer! Often three or four blows are needed to divide the object, so it can be swallowed and the bird looks around at every stroke to see if the coast is clear. But back in western New York and Pennsylvania, they were shy and secretive, living for the most part in the grand old woods. It seems to me this difference in habits may be largely

due to the scarcity of timber in this region, which makes it a necessity for them to live near the abodes of men. As population increases, their habits of familiarity are increased, and so the blue jay has become one of the tamest and most domestic of our Iowa birds, tolerated for his beauty and sprightliness in spite of his alleged, and I fear too often apparent, depredations upon other birds.—*Charles Aldrich, Webster City, Iowa, June 11, 1881.*

THE ORGANS OF SMELL IN LAND SNAILS.—Dr. Sochaczewer has endeavored in the *Zeitschrift für wissenschaftliche Zoologie* (1880), to decide between the claims of the tentacles, the organ of Semper, and the pedal gland to be regarded as the organ of smell in land snails. It has been known for many years that the tentacles each contain a large ganglion whence radiate five fibers with the investing epithelium, giving rise to terminal knobs, endowed apparently with a sensory function. Naturalists differ as to the office of these organs, for some, like Linnæus, regard them as having the sense of touch. In order to decide the matter, Dr. Sochaczewer cut off the tentacles of *Helix pomatia*, and after the healing process was completed, the snail was placed in the center of a flat plate, the edge of which was smeared with oil of turpentine. The movements of the snail were very slow and uncertain. When it approached the edge of the plate, it behaved itself exactly as did a snail in which the tentacles were completely uninjured, returning at last to the middle of the plate, and withdrawing itself into its shell. This and similar experiments seem to show that the tentacles are not the seat of the sense of smell.

The author next considers Semper's organ, discovered by Professor Semper in 1856. Small in *Helix*, *Arion* and *Lymnæus*, it is best developed in *Limax*, where it exists in the form of four or five glandular lobes in the sides of the mouth. The author decides that this is simply a gland without any sensory function, and that the organ of smell exists in the foot-gland which is well supplied with nerves, and is of some size. The author claims that in this structure, which is situated in the middle line of the foot, are found the three necessary factors of an olfactory organ, *i. e.*, of sensory cells, the entrance of air, and the addition of a secretion from a gland. The orifice at the anterior margin allows the air to enter; the olfactive matters contained in it are mixed with the secretion, and so come in contact with the peripheral nerve-cells. The author concludes by pointing out that the sensory arrangements which obtain in the invertebrates are not to be too closely or hastily compared with those seen in vertebrate animals.—*Journal of the Royal Microscopical Society.*

THE STRUCTURE OF THE ORANG OUTANG.—Under this title Dr. H. C. Chapman has published in the Proceedings of the Academy of Natural Sciences of Philadelphia, notes of the dissection of a male orang. The author states that "the cerebellum in my orang was relatively larger than that of man, but smaller than that of

either the chimpanzees I have dissected, and was just covered and no more by the posterior lobes of the cerebrum." He closes his paper with the following remarks :

"What can be inferred from the general organization of the orang as to its relation to the other primates? The orang like man has twelve ribs, whereas the gorilla and chimpanzee have thirteen ; on the other hand, the carpal and tarsal bones are nine in number in the orang, while the chimpanzee and gorilla agree with man in having eight. The upper extremity of the orang resembles that of the gorilla in the absence of the *flexor longus pollicis*. The chimpanzee and man are alike in this respect, at least the slip from the *flexor longus digitorum* in the former is functionally a *flexor longus*. In the absence of a *flexor longus hallucis*, and in the presence of an *opponens hallucis*, the orang differs from man, the anthropoids, and all the monkeys. The great blood vessels arise from the arch of the aorta in the gorilla and man in the same way ; the same disposition is usually seen in the chimpanzee, rarely in the orang. The lungs in the orang are not divided into lobes, as in the gorilla, chimpanzee and man. The stomach in the gorilla and chimpanzee is human in its form ; in the orang, however, it is quite different. The peritoneum in the gorilla, chimpanzee and orang is like that of man ; in the lower monkeys it is different. The brain of the orang in its globular form, in the cerebellum being usually covered by the cerebrum, and in the development of the first occipital gyrus, resembles man's more than that of the gorilla and chimpanzee. On the other hand, the frontal and temporal lobes in the orang are not as much convoluted as in the chimpanzee, and still less than in man, and the island of Reil is not convoluted at all, at least in my orang.

MARINE ANIMALS IN AQUARIA.—The great aquarium and laboratory founded by Dr. Dohrn is exerting a decided influence on the progress of biology, as many of the leading German, English, Russian and Italian zoölogists have, owing to the unusual facilities for studying living marine animals of the Bay of Naples, produced a series of works of high interest and value. To give some idea of the facilities enjoyed by those who work at this celebrated seaside laboratory, the following account is compiled from a notice in the Journal of the Royal Microscopical Society :

Among animals breeding in the aquarium, none are so easily observed as the large crustacea and molluscs. The large crabs pair and lay eggs, though the zoëæ or larvæ, could not be reared ; lobsters notwithstanding their salacity, rarely produced eggs in captivity. Of molluscs, the best breeders are species of *Loligo*, *Sepia*, *Aplysia* and *Doris*. Though many nudibranchs lay freely, their eggs never come to maturity. But many of the lower animals without any care whatever, thrive and multiply wonderfully. Compound Tunicates take the lead among these "spontaneous" productions. The graceful Botryllidæ exuberate in

both the northern and southern tanks. Compared with Ascidians, Polyzoa are not very generally distributed. Bugula is now the commonest, especially in the compartment for eels, where it flourishes along with Zoanthus and Hydractinia. Mullet and some other fishes, hurtful to various low growths, soon scour the rocks tenanted by Ascidians.

The tank allotted to Annelids affords a spectacle of great beauty and variety; in short, it is a perfect microcosm. Of its inhabitants, we can only note the young of a species of *Spirorbis*, a well known commensal of *Palinurus*. This annelid multiplies so fast that much trouble is spent in removing its tubes, shaped like a post-horn, which soon cement themselves with obstinate firmness to the glass windows of the aquarium.

Fishes, if we except Selachians, do not breed well in the aquarium. Otherwise, they are flourishing prisoners; the conditions unfavorable to their propagation have not yet been thoroughly ascertained.

THE EYE-LIKE ORGANS OF THE SKIN OF CERTAIN FISHES.—M. Ussow, in the Bulletin of the Imperial Society of Naturalists of Moscow, 1879, gives an account of these singular organs in *Astronesthes*, *Argyroplicus*, *Chauliodus*, *Gonostoma*, *Maurollicus*, *Scopelus* and *Stomias*. He finds that in *Astronesthes*, *Chauliodus* and *Stomias* there are eyes, furnished with bodies analogous to crystalline lens, humor, retina, and pigment. He traces their nervous connection to the interspinal nerves. In the remaining genera he finds the structure to be much more simple. Their cavities containing only a gelatinous connective tissue. Mr. Solger observes the latter kind of bodies in the American genus *Porichthys*, and thinks them to be rudimental eyes. During the present year, Dr. Leydig has investigated the same objects, and confirms the results obtained by Ussow. He, however, holds a different opinion as to their uses. He thinks them electric organs more or less developed. It is known that they are in some of the genera at least, luminous. Dr. Günther describes an extraordinary fish of the cod family from great depths of the Atlantic, in which the eyes are replaced by a large, probably luminiferous, organ which covers the entire frontal part of the top of the skull.

MASON'S MICROSCOPIC STUDIES IN THE CENTRAL NERVOUS SYSTEM OF REPTILES AND BATRACHIANS.—A third article by Dr. John J. Mason on this subject, appears in the Journal of Nervous and Mental Disease for January, 1881. The author has studied the nuclei of the spinal cord of the alligator and *Heloderma suspectum*, our largest lizard; and he reaffirms from his new studies the law previously formulated that "the nuclei of the so-called motor cells of the central nervous system have, in the same individual, average diameters, which are proportional to the power developed in the related muscles."

THE JELLY FISHES OF NARRAGANSETT BAY.—A beautifully illustrated memoir entitled "Studies on the jelly-fishes of Narragansett bay," by J. W. Fewkes, appears in the Bulletin of the Museum of Comparative Zoölogy, under date of February, 1881. It contains an account of certain new Acalephæ, collected by the author during three summers spent at Newport, with anatomical and embryological notes. As it is impossible to give an abstract of the article, we would refer the reader to the memoir itself, merely stating that a number of interesting forms originally described by Professor McCrady from Charleston, South Carolina, range as far north as Newport.

ZOOLOGICAL NOTES.—In a list of mammals collected by Dr. E. Palmer, in north-eastern México, with field notes by the collector, published in the Bulletin of the Museum of Comparative Zoölogy, it is stated that the bison was killed as food by the settlers at Monclora and Parras probably half a century after the Spanish conquest. "There seems to be no reason why, so far as the nature of the country is concerned, the bison may not have ranged also to Saltillo." Dr. Palmer found no indications of the prong-horn antelope in any portion of the region he traversed. This is an important negative fact, adds Mr. Allen, as tending to fix the northern limit of this species, as it is known to occur farther westward in the northern parts of the States of Chihuahua and Sonora, while Berlandier is cited by Alston in the Biologia of Central America as authority for the statement that its range extends "southward at least throughout the State of Tamaulipas."—The *Novice*, an Austrian paper, announces the discovery, by MM. Robie and Clessen, of two new species of snails, near Predvor, in Carniola. They are without eyes, and have no need of the organ of sight, since they live in the dark, in water flowing very slowly underground. They have received from their discoverers the name of *vitrinella*, one of them, on account of its slender form, being further named *gracilis*.—It appears from a paper by Professor T. J. Bell, that of the genus *Asterias* (*Asteracanthion* of other authors), which embraces the common star fish or five finger, there are more than eighty species already described; Bell adds five to the list, and indicates how the species should in his opinion be classified.—The "sea-spiders" (*Pycnogonida*) dredged, under the supervision of Alex. Agassiz, by the U. S. coast steamer *Blake*, dredged along the east coast of the United States during the summer of 1880, have been described, with numerous figures, by Mr. E. B. Wilson, in the Bulletin of the Museum of Comparative Zoölogy. The remarkable feature in their deep sea forms, as in those elsewhere found, are their colossal size, compared with the shoal water forms; also, in a number of forms, the eyes (*ocelli*) are (1) either rudimentary and destitute of pigment; or (2) entirely absent; while on the other hand in *Pallenopsis* the eyes are relatively of un-

usually great size. The remarks on the morphology and innervation of the anterior appendages are excellent, and have an intimate bearing on the systematic portion of these creatures, for Mr. Wilson sagaciously remarks that "it is easily possible that the external resemblances of a Pycnogonid to an Arachnid are those of analogy only, and have no morphological significance. This is the more probable from the extreme variability of the three anterior pairs of appendages in position and structure."—In the same Bulletin Mr. S. Garman reports on the Selachians, all captured at great depths, belonging to species hitherto unknown; the results of this and other deep sea work indicate (1) that the migrations of these animals, including the fishes, are much more limited in extent than has generally been supposed; and (2) these creatures especially the skates, are more or less affected by a period of comparative inaction, in a measure corresponding to what obtains among Batrachia and Reptilia. Concerning the migrations of fish and Selachians, there are many species in our waters, the author remarks, "whose movements do not amount to more than short runs from shoal to deeper water and back again. Others would seem to extend their travels from the coasts and banks to the Gulf Stream. And still others make much more extensive migrations."—The anatomy of the African elephant is much less known than that of the Asiatic species, which is naturally far more abundant in menageries and zoölogical gardens. Messrs. Plateau and Liénard have recently published the results of the dissection of an African species, with especial reference to the heart, larynx and male reproductive organs. *Apropos* of this interesting animal, it would seem probable that Yankee perseverance and painstaking may enable us to raise our own elephants. Barnum's baby elephant, born at Philadelphia, is growing rapidly, and is a vigorous creature in its third year. Its mother is again about seven months along in pregnancy, and it is therefore not unlikely that a second one will be born in this country. The sexes in Barnum's herd of elephants pair readily in confinement. We learn on good authority that an American resident in India of thirty years, never heard of an elephant being born there, and was astonished at learning of the birth of one in the United States.—Mr. W. A. Forbes has succeeded Professor Garrod as prosector to the zoölogical society of London. He is successfully rivaling his able predecessor in the quality of his papers, which are chiefly devoted to the anatomy of mammalia and birds.—Dr. Trouessart has completed his catalogue of the mammalia as far as the end of the *Rodentia*, including that order with the *Prosimiæ* and the *Quadrumana*. The number of species is so far 2061. The catalogue will be very useful to students, as it includes synonymy and geographical distribution, as well as the extinct species.—Mr. Gentry continues his illustrated quarto work on the nests and eggs of American birds. The last plates issued are very good,

and the text is written with considerable literary ability.—Mr. Ridgway gives a list of the species of birds of Illinois which is critical and very full, including 341 species.

ENTOMOLOGY.¹

THE EGG-CASE AND LARVA OF *HYDROPHILUS TRIANGULARIS* SAY. As the nidus and young of this beetle do not appear to have been observed, a few notes gathered from an examination of several egg-cases and of larvæ hatched from them may be of interest. The cases were collected about the first of June, 1876, from a small pool of water in the Normal School grounds at this place. A half dozen were obtained floating at the surface of the water, with bits of weeds and dead leaves attached to the upper surface as floats (Fig. 1). In no case were they secured to living plants,

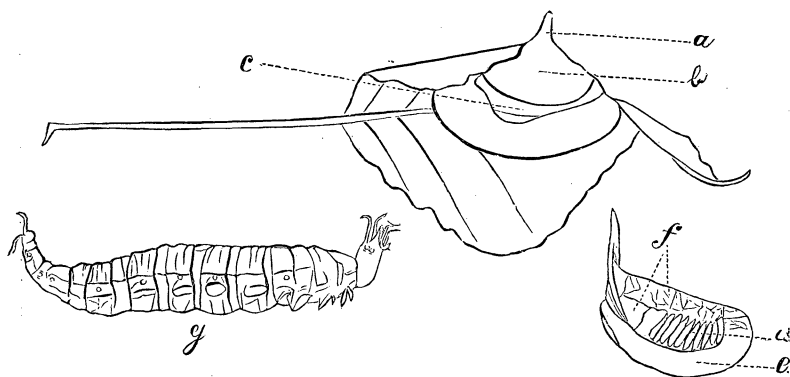


FIG. 1.—Eggs, egg-case and larva of *Hydrophilus*, nat. size; *a* air-tube, *b* expanded lower portion of tube; *c* opening into nidus; *d* eggs shown in vertical section of nidus; *e* empty under portion of the case; *f* chambers above eggs; *g* larva. (Garman *del.*)

as the egg-case of *H. piceus* is said to be. In one instance a female was discovered finishing her case. The last touches were being put on the expanded lower portion of the “horn” (Fig. 1, *b*), this part of the latter being then of a rich yellow color. The nidus and its maker were lifted gently in the hand and carried a distance of about one hundred yards; and so absorbed was the beetle that she continued her work, and on being put into a vessel of water finished her task. When the case was next observed the yellow material had been concealed by a brown gummy coating.

The surface of the egg-case is smooth, light brown, and resembles very closely that of the nidus of the large black and yellow spider, *Argiope riparia* (?). Viewed from above or below, the outline is a good circle. The diameter is about 20^{mm}, the

¹ This department is edited by PROF. C. V. RILEY, Washington, D. C., to whom communications, books for notice, etc., should be sent.